

Wild About Weather



Designed by Tracie Talluto

Problem Solving/Data Gathering Unit

for

Echo Lake Elementary, 2nd Grade

by Susan Alotrico

December 11, 2009

Describe the Learners

There are 26 second-grade students, 14 boys and 12 girls, in my classroom at Echo Lake Elementary. There are 10 non-European White students. Some ethnic backgrounds include Korean, Vietnamese, Spanish, Japanese, and Ethiopian.

For the most part, they are on target for the expected achievement levels for their age. Title 1, special education and ELL services, and small group work are utilized. Two students have IEP's and receive special education services, four students receive ELL services, and five students receive Title one reading services.

Second-graders are focused on building proficiency in addition and subtraction, measurement concepts, and comparing the difference between two and three dimensional objects. They are involved in inquiry and hands-on exploration of phenomenon such as balance and motion. They are capable of constructing reasonable explanations of their observations. Some students are perfectionists and if they cannot complete a task within a self-determined time frame they give up easily and openly cry. Other students will "fake" completing a task, so they can move on and avoid being perceived as slow. It will be important to give students generous time and opportunities to feel successful.

As far as classroom management, students know and practice ready position. They know they are supposed to have eyes on the teacher and raise hands before speaking out. My teacher uses a reminder, warning, owe 5 (five minutes of recess) process when students do not follow directions.

Developmentally, second graders think logically and offer rational answers that are on task. They are capable of following a series of steps and are able to explain why they arrived at a certain conclusion. They can see the points of view of others rather than believing everyone else sees the world as they do. They can think in symbols and know the difference between a "+" sign and a "-" sign. They can problem solve, work together cooperatively, and see how individual actions affect the greater good. They can engage in reverse thinking. When the teacher puts a "9" on the board, students will offer equations as diverse as 9×1 , $109 - 100$, $5 + 4$, $8 + 1$ and $190 - 100 - 10$. The majority of the students said math was their favorite subject; so far, this is holding true.

To ensure the unit accounts for diversity and learning abilities of all students, my cooperating teacher and I will model and scaffold all learning expectations. There will be enough guided practice for all students to be successful during independent practice. We will also use various methods to check for understanding. Many of the activities are student-guided and involve discovery through the process of experimentation, asking questions, and testing out ideas. In this case, teachers may direct students to find out how air pressure works, or how air moves things and not model the 'right' way.

All students will be able to initiate discussion about weather because they all have some prior experience to share. This will acknowledge developmental levels and cultural backgrounds of students because all students will be encouraged to share what they already know. I will incorporate story telling, theatre, and movement throughout the unit, which will tap into different learning styles. Students will work in cooperative learning groups when appropriate. I will group high-level students with medium-level students, and medium-level students with low-level students. I will also pair my more mature students with those who need to develop their social skills. This will give all students the greatest potential for successful learning. Students will learn from one another.

The classroom environment is supportive and caring. Students are praised for taking risks and helping others. Asking questions and sharing ideas are encouraged, and all students are given an opportunity to be heard. For instance, the teacher asks students to share their thinking during Arithmetic Developed Daily drills, or ADD math. All ideas are accepted and the mission is to see which one makes sense and works. An ADD worksheet is the first job of the day for students.

Describe the School

The school is welcoming to visitors and parents, and the theme among staff and teachers is collaboration. Teachers are expected to dress professionally and behave professionally. There is positive talk in the lunchroom. I have never heard disparaging or negative talk amongst teachers. All students are expected to be respectful and responsible. Walking quietly in the halls is the norm and all teachers provide gentle reminders if the moment calls for it. Classes can

receive free recess with respectful and responsible (R&R) cards. This is an effective motivation tool in second grade and can be applied to the unit as an example of how we show respect to others.

There is a willingness to collaborate among grade levels. Our class has fifth grade buddies with whom they will be participating in literacy activities. My cooperating teacher is very open to trying new things. She has encouraged me to teach the air and weather unit and will ensure the unit receives all the time it needs to teach students what they need to know. The school uses Foss science kits to teach science. Three main units are taught: balance and motion, air and weather, and insects. The school also utilizes the 'Growing With Mathematics' math curriculum.

The school is a model school for use of technology. Starting at the fourth grade all students take home laptops and use of technology is integrated into subject areas in a developmental and grade appropriate manner. My teacher maintains a great class website and I have noticed that students have been encouraged to blog their inferences during a literacy unit on the class website. From what I have seen in the classroom, technology is used with the document camera and computers for AR tests.

Describe the Community

The second grade students at Echo Lake Elementary live in the suburban area of Echo Lake and greater Shoreline about 20 miles north of Seattle. This is a middle-class neighborhood with busy arterials adjacent to homes. Sidewalks are often non-existent and Aurora Avenue is three blocks away with its endless strip mini-malls, franchised outlet stores, and a few locally owned businesses in between. Neighborhood associations are active in bringing people together around social, political and environmental issues affecting their community. A YMCA is located three blocks from the school on Echo Lake. We have a few family volunteers in the classroom, so I am inferring most adults work during the day. Parent turn out at curriculum night was about 25 percent, and many did not appear for personal conferences. This may mean I need to work extra hard and make personal connections with family to ensure their participation in projects.

Webpage

A webpage has been created at: www.airaware.wikispaces.com, for family members to access information about the unit, family activities that can be done at home, student homework assignments and resources, such as books, videos, and on-line quizzes, etc. Specifically, parents will be asked to help their child with night sky observations. A letter with worksheets and log will go home in the student's homework packet on day eight of the lesson to explain the project. Families of students who live in separate households will get information on how learning can be supported at home and how to help with homework assignments.

Central Question

What is air, how does it affect us, and how do we use it? These central questions capture the broad universe of air, atmosphere, and weather. They allow conversation to turn to why we need air to live, and how we use it in our daily life. The questions connect to the exploration of air as matter, air takes up space, and air moves things. It allows us to explore all the facets of weather that surround us each and every day. Kids will look up into the sky and consider the mysteries of the universe through that wondrous substance that we cannot see, touch, or smell.

Rationale

In the simplest sense, we need to know the weather in order to dress appropriately each and every day. Air and weather are concepts we take for granted and yet there is much to explore in terms of observation, data collection, and other investigations. By the time students' graduate from high school they will have learned a lot about the weather, about cold and warm fronts, and wind patterns and the jet stream, just by listening to weather reports on news and radio, and seeing the weather maps on TV and in the newspaper.

This unit will enable students to use mathematics in ways that help them make better sense of the world by observing the natural world, collecting data, and making predictions about weather. This will give them real world knowledge and application of math in an every day sense.

This unit will also help make children aware of how air and weather have long been the subjects for literature and music. I will introduce children to poems, stories, songs, and myths about weather. This will help them gain an awareness and deeper appreciation for a phenomenon they take for granted.

Unless children begin to care about something they cannot see, like the air, they will not appreciate the fact that the air we have available on the planet is a finite source. We breathe the same air as the dinosaurs once did. It is constantly being recycled by wind and rain, and our oxygen is being replenished by plants. This will help students see how everything is connected and serves a greater purpose. I hope this will fascinate children as much as it fascinates me and will lead them to wonder and care about the natural world.

Moral/Ethical Considerations

As an ethical teacher, I need to know my content as well as know my students. This means not only being prepared with materials, but taking into consideration the academic, social, emotional and developmental levels of my students. I need to be able to read my students and shift focus in the moment to be able to respond to the needs of my students. I need to be willing to learn from my students. As Echo Lake Elementary first grade teacher Kathryn Pihl noted, in a recent presentation to Seattle University MIT students, she learns excellent ideas for teaching from her students. I need to view my role as facilitator and remember my job is to open windows in the minds of my students and not dictate theory. If I find something is not working or that my students become vastly disinterested, I need to be flexible and able to make adaptations, or scrap what I am doing altogether and move in a different direction. Other moral and ethical issues involve giving all students the opportunity to be heard. It is hard to give 26 students your individual attention, but I do need to work at giving all of them a chance to participate, and involve students who do not readily raise their hands. Vocal students can easily dominate class. This can make for a passive learning environment for others. I will use ideas such as 'name sticks' to randomly call on students. They are familiar with this and know they have the option of passing if they do not wish to participate.

Teaching strategies that will help engage all students include pair-share, turn and talk, and cooperative learning. This will allow students to exchange ideas with classmates and learn from each other. Students already sit in groups and it will be easy to incorporate group discussions in the moment.

Other issues include providing equal access to information on homework assignments to parents living in different households. One solution will be to allow students with those circumstances more time to finish assignments and to send homework assignments to both parents. The website will provide an effective way to help parents stay apprised of student activities and responsibilities. The two students with IEP's will be given additional time to finish assignments as well. If cultural factors and values prohibit family interaction, my teacher, resource room teachers, and myself, may have to serve as surrogates for any other assignments.

As an ethical teacher I am obligated to know the content I am teaching. Between now and when I teach this unit, I will be reading and studying more on air and weather so I am confident in my abilities to teach this content. Resources I will use include the Foss unit, as well as those that I have listed in the bibliography section.

EALR's and GLE's

The unit meets the science EALRs and math standards well. Through Science EALR 2: Inquiry, students will be encouraged to ask questions about weather events, and the air, to help them construct knowledge and form predictions about what will happen. This EALR also addresses what students will be doing when they observe weather properties and gather daily data on temperature, rain, snow, and wind. They will understand the importance of recording data accurately and carefully, and to create results they can draw conclusions from. The math standard core content area of measurement matches exactly what students will be doing with data. They will measure rain for instance, collect data over a period of time, and interpret data by creating a bar graph. This will allow them to see the shape of the weather over time. We will be able to compare the weather to the same period last year.

Learning Target	EALRs/GLEs	Evidence of Achievement	Assessment Criteria
LT 1 Students will know the properties of air. <i>(fact)</i>	Science 1.3 Changes: Understand how interactions within and among systems cause changes in matter and energy. Science 2.1 Investigations systems: Develop the knowledge and skills necessary to do scientific inquiry. 2.1.1 Understand how to ask a question about objects, organisms, and the events in the environment.	K-W-L chart Participation in all investigative activities that explore air takes up matter. *Activities: Bags of air, air underwater, parachutes, balloon rockets. * <i>(Foss Kit)</i>	Pre-assessment/ Summative (K-W-L chart) Formative Teacher checklist

Learning Target	EALRs/GLEs	Evidence of Achievement	Assessment Criteria
LT 2 - Students will know the components of weather by observing the sky. <i>(fact)</i>	Science 2.1.1 Understand how to ask a question about objects, organisms, and the events in the environment. 2.2.1 Understand that all scientific observations are reported accurately even when the observations contradict expectations.	Completion of Cloud Watcher Worksheet. Student accurately draws and labels three basic types of clouds. *Completion of bubbles in the wind activity. *Completion of Anemometer Activity. Completion of wind streamer. *Completion of wind vane. *Completion of night sky observation worksheet. (Homework) * <i>(Foss Kit)</i>	Formative Teacher Checklist Performance Portfolio Summative - K-W-L chart

Learning Target	EALRs/GLEs	Evidence of Achievement	Assessment Criteria
LT 3 - Students will use basic weather tools to gather information about weather, and measure, record, and graph class data. <i>(skill)</i>	Science EALR 2-Inquiry: the students know and apply the skills, processes, and nature of scientific inquiry. Math Standard Core 2.4 Additional key content: 2.4.B Collect, organize, represent, and interpret data in a bar graphs and picture graphs.	K-W-L chart Students create weather calendars. Students create air and weather journal and make daily entries for temperature, weather conditions, cloud types, rain, and wind velocity and direction. Students accurately take temperature of ambient air. *Students make thermometer. *Students accurately use rain gauge. *Completion of weather graph * <i>(Foss Kit)</i>	Pre-assessment K-W-L chart Formative: Anecdotal notes Teacher Checklist Portfolio Summative: K-W-L chart
LT 4 - Students will wonder about and appreciate the natural world around them. <i>(disposition)</i>		Students have questions and contribute to class discussion and reflect on what they are learning. Completion of sharing writing of weather poem and artistic drawing.	Formative: Portfolio

Learning Target	EALRs/GLEs	Evidence of Achievement	Assessment Criteria
LT 5 - Students will be able to think, listen, and share with others, help others understand concepts, relate to other points of view, and communicate with respect. (<i>skill</i>)	Communication 2: The student uses communication skills and strategies to interact/work effectively with others. 2.2.1: Understands how to show respect for others' input.	In small and large groups, students share ideas, listen to one another, and help others form ideas about air and weather.	Formative: Teacher check list Student self-evaluation

Pre-Assessment

Students will have a great deal of knowledge and experience about air and weather. In order to compile what students already know, they will each fill out a K-W-L chart about air. This will be created on the first day of the unit.

In addition, as students progress through the unit, new concepts will be introduced. Before each new lesson starts, students will have an opportunity to reflect on what they have learned and what they know about the new topic. Student ideas will be reflected on a poster and any questions will be noted. This information will help guide the scaffolding, content and connections teachers make with students and their experiences. It will also help to see what information and experiences have stuck from the last lesson. Other formative assessments will be conducted that require students to draw and write examples. These will be collected in a portfolio over the course of the unit. Students will get a checklist of what teachers will be looking for in their portfolio so they can be prepared to show their best work at the end of the unit.

Students will have an opportunity to look at their own learning and appraise their attitude, readiness, and participation in learning. Students will fill out a self-assessment form to gauge willingness to learn and how they are working cooperatively. This self-evaluation tool will examine how students are performing in groups, in class discussion and during individual work

time. They will have the opportunity to note their strengths, and be given opportunity for improvement.

An artistic response to learning about air will include a class-generated poem through a shared-writing lesson. Each student will be able to draw a picture or image to accompany the poem. This will help me evaluate the dispositional learning target.

Most of these assessments are informal and data will be collected by observing and listening to students actively working in groups, participating in activities, and class discussion.

Post-Assessment

Learning experiences in this unit are hands-on and tangible to make the invisible content of air, real and alive. Students will be conducting activities about air and weather and reflecting on activities daily. They will compile all their worksheets, drawings and writing into a portfolio. At the end of the unit, students will be asked to complete the “L” portion of their K-W-L chart as the summative assessment.

Lesson Abstract

Over the course of four weeks, students will learn about the air around them, observe weather conditions, learn and make weather tools, record and graph data, and report on findings. The unit takes students through an active exploration of air using many science investigations provided in the Foss Air and Weather Unit. This is the kit my cooperating teacher requires I use and is provided by the district. The unit will start in late January. Each lesson will be about 45 minutes and the unit will be taught three or four times a week for four weeks.

Students learn about air concepts through a progression of lessons. First, students learn about the air we breathe, the thin layer of breathable air surrounding the planet, and air as a gas that takes up space and moves objects. Some of the first explorations students participate in ask them to consider if air takes up space. Students experiment with air pressure to see how compressed air can move things. The students move on to observing the air around them, the temperature, clouds, wind, and rain. Students will learn how to measure and report the weather conditions. They will understand the scientific process of recording results with accuracy and

reporting results with explanations. Students will be recording daily conditions in an Air and Weather Journal. Homework and family activities include observing the night sky, identifying clouds, and making a wind streamer.

Students will continue to collect and record weather data after the unit has been completed. I feel it is necessary to have at least four weeks of weather data to review so we can graph our data on bar charts to see strong weather patterns and associations. In this manner, students will be able to count how many rainy days compared to sunny days, etc. A bar graph will show weather components side by side to help students see connections between clouds and rain, and cold temperatures and clear nights, for instance. Students will learn how to graph the data they have collected, explain results, and make comparisons with last year's data during the same time period.

In the end, students will be able to share what they have learned by picking out items from their portfolio that show their understanding of air concepts, weather conditions, and an appreciation for the natural world around them.

All activities give students the opportunity to make sense of what they are learning through discovery. This approach enables students to think critically, answer and pose questions, learn from others, and solve problems regardless of capability or ethnic background.

Students will learn through heterogeneous cooperative learning groups as well as through individual work. Time will be given for students to reflect and consider what they are learning. Students will know what is expected of them to learn and why. Multiple intelligences will be tapped through kinesthetic experiences, such as the molecule dance, an activity where students move as air molecules that are hot, cold and all variations in between. Most activities ask students to draw as well as write their observations of the natural world. Student's varied approaches to learning will also be recognized by instruction that allows individual think time, pair share, and turn and talk opportunities, as well as group work. Student learning will be validated by encouraging them to go home and teach their families something new they learned at school that day about air. Each lesson will also validate what students are learning by asking students to reflect on what was learned the 'last time.' In this way, prior learning stays connected.

Outline of Lessons**Day One Activity: Air is There****Co-Teaching Strategy: One teach one observe**

LT 1- Students will know the properties of air.

LT 4 - Students will wonder about and appreciate the natural world around them.

LT 5 - Students will be able to think, listen, and share with others, help others understand concepts, relate to other points of view, and communicate with respect.

In this first introductory lesson, students will be asked a riddle, “What is all around us but we can’t see, taste or smell it?” In addition, students will share everything they know about the air around them. This will be captured as a pre-assessment on a concept chart. The teacher will share some facts about how many gallons of air we breathe each day and how many breaths we take each day. Students will hold their breath to see how long they can survive without air. An apple demonstration will reveal the shell of air that surrounds the planet. Students will be asked to define what air is and what it does. Students will move into activities that show air is matter. First, a plastic baggie with air in it will be used to start discussion. Then each will be given a baggie filled with things that can be moved with air, such as a feather, pingpong ball, and also a straw. Students will be given free time to explore air. Students will gather together following the activity to share results. The teacher will provide information about the properties of air and that air is a gas. A word bank will be created of terms used. An Air and Weather Journal will be passed out and teachers will explain to students how it will be used. A reflection at the end of the lesson will ask “What did we learn about air today?” They can write in their journal and draw something that represents what they learned.

All students will have the opportunity to learn from the start of the unit because learning will begin from their existing knowledge. All students will have the capability of understanding the importance of air around them and will have significant experiences with air and weather in their lives already. Small group and whole class discussion will allow students to hear multiple perspectives and work through problems presented through activities. Students will listen to one another, learn from one another and begin to value perspectives different from their own.

Day Two Activity: Air Under Water & Parachutes

Co-Teach Strategy: Station Teaching

LT 1 - Students will know the properties of air.

LT 4 - Students will wonder about and appreciate the natural world around them.

LT 5 - Students will be able to think, listen, and share with others, help others understand concepts, relate to other points of view, and communicate with respect.

In this lesson, students will further explore the properties of air, how it takes up space, can be captured, and how it pushes against things to move them. To start, they will be encouraged to share what they learned in the previous lesson. The teacher will share how we can understand air like little pieces stacked on top of one another. Students will be told that air pressure is always pushing against us. In fact, about 14 pounds of air per square inch is pushing against all things at sea level, where we live. But, because air is fluid, it is always moving around. Air flows like water, so it is like we are diving into water. Students will be separated into two stations. Half the students will be exploring the properties of air exhibited under water. The other group will make parachutes to explore how air pushes against an object. At the end, students will gather with their group and share some observations. Students will be given time to write and draw in their journal. For homework, students will be asked to go home and think about a toy that uses air to work. If they do not have a toy that uses air, they can invent one and describe how it works. Examples will be shown to students. Hand out air toy worksheet.

Small group and whole class discussion will allow students to hear multiple perspectives about how air pushes things. Students will listen to one another, learn from one another and develop new questions about the topic.

Day Three Activity: Air Under Water & Parachutes

Co-Teach Strategy: Station Teaching

LT 1. Students will know the properties of air.

LT 4 - Students will wonder about and appreciate the natural world around them.

LT 5 - Students will be able to think, listen, and share with others, help others understand concepts, relate to other points of view, and communicate with respect.

The two stations will switch. At the end, groups will come together to reflect on what they have learned and have time to write in their journal. Any extra time available will be used to tell a story that has air or weather as the central theme.

Day Four Activity: Balloon Rockets

Co-Teach Strategy: One teach one assist

LT 1 - Students will know the properties of air.

This activity will apply concepts learned thus far and show how air can exert pressure to propel objects. After a brief introduction, students will launch their balloon in the balloon rocket launcher. To add a mathematical element, students will measure distance traveled for each balloon and chart results. During the activity, teachers will ask students to think about what they know about air so far and what could be happening in this activity. Explain that the air in the balloon is compressed by the rubber of the balloon around it. This creates a force to propel or push it forward. Next, have students fill a baggie with air and put it inside the balloon launcher. Ask students why the baggie did not move. The answer being you cannot pump enough air into the baggie to create compressed air. Because the rubber in the balloon stretches, you can fill it with more air. Next, have students predict what would happen if they blow up balloons and launch them without the rocket launcher. Students will go outside and launch their balloons at the same time. They will notice the direction most of the balloons flew and ask, was wind a factor? Have students gather their balloons and sit down to discuss what they learned about balloons and how air made them move. Students can go to their desk, fill out the page in their journal, draw a picture and describe something they learned today. Students will also share toys they have that use air, or that they invented.

After each lesson, students will be asked to make connections, compare and evaluate what they learned in the previous day's lesson and relate it to the new lesson. This builds critical thinking skills and self-efficacy. Following group activities, students will be asked to assess how they did working with others. They will identify things they did well and things they feel they need to improve. This reflection is empowering and builds their self-confidence and self-efficacy because they have control of their learning.

Day Five Activity: Weather Calendar Co-Teach Strategy: One teach one assist

LT 2 - Students will know the components of weather by observing the sky.

LT 3 - Students will use basic weather tools to gather information about weather, and measure, record, and graph class data.

LT 5 - Students will be able to think, listen, and share with others, help others understand concepts, relate to other points of view, and communicate with respect.

Introduce the subject by asking students to close their eyes and think about the weather outside. Tell them when they open their eyes they will be weather experts and give a prediction about what will happen in the weather today. Ask them to explain their predictions. This activity will allow students to think about their own prior experience. Students noticed the weather today for instance, by putting on the appropriate clothes. It will also help me see what students already know about weather. After taking some comments, read the book, 'If We Could See The Air' by David Suzuki. Have a brief discussion about what students learned. Tell them we will become weather experts over the next few weeks. We will be collecting information on weather each day. Ask them what kinds of information they think we will collect. After taking some ideas, tell them we will be measuring temperature, rain fall, wind speed and direction, as well as learning the types of clouds. We will be making a calendar to represent the weather we see occurring. We will have two class weather experts, meteorologists, who will observe the weather each day and add a weather symbol to the class weather calendar. This will be done in groups of two so everyone will get a chance to do it by the time the unit is over. Next, tell them they will be going outside to observe the air and weather through their senses. Ask them what words they would use to describe the weather. Have students come back inside and talk about words that describe the weather. Introduce weather symbols and the class weather chart we will be using. Have the day's meteorologists place the appropriate weather symbol on the class weather calendar. Tell them to turn to the appropriate weather page in their journal and make an entry about today's weather. They will draw a picture and describe weather. Create a word bank of new weather words introduced today.

Hands-on activities in today's lesson allow students to experience deep, personally meaningful-learning, as they explore the air around them. When learning is meaningful, students will retain what they learn and stay interested. (Brophy and Alleman, 2007, p.311).

Day Six Activity: Measuring Temperature

Co-Teach Strategy: One teach one assist

LT 2 - Students will know the components of weather by observing the sky.

LT 3 - Students will use basic weather tools to gather information about weather, and measure, record, and graph class data.

Tell students to count the number of students who are wearing sweaters or jackets today. Do the same for tee-shirts and any other category that seems appropriate. Ask them what this tells them about the weather today. After taking some comments, ask who knows how to tell how cold or warm it is outside. After taking some comments, tell them we will be making thermometers to take the temperature of the outside air each day. Show them the class thermometer and how it moves the temperature up and down. Demonstrate different temperatures and ask students to tell what temperature it is. Make sure to include negative temperatures and ask students what kind of weather would be happening during those weather events. Fill two buckets with cold and hot water and show students how to measure the temperature in each. Give students the opportunity to do the same in groups. Next, students will build their own thermometers with the teacher modeling each step of the activity. After they have built their thermometers, hand out the Foss math worksheet that asks students to count by two's to determine various temperatures. As a final activity, lead students through the molecule dance. This will give them the experience of how an air molecule is affected by hot and cold temperatures. Leave time for students to draw and write in their journal about what they have learned today. Have the class meteorologists gather weather data and add to class calendar.

Day Seven Activity: Watching Clouds

Co-Teach Strategy: One teach one assist

LT 2 - Students will know the components of weather by observing the sky.

LT 3 - Students will use basic weather tools to gather information about weather, and measure, record, and graph class data.

LT 4 - Students will wonder about and appreciate the natural world around them.

Read the 'Cloud Dance,' by Thomas Locker. Ask students to share thoughts and comments. Ask what is a cloud? Entertain a few comments. Tell them clouds are basically made up of tiny water droplets. Tell students they are going to become cloud watchers. Take them outside to observe the clouds. Tell them to search for three different types and be ready to describe them. After the class returns have students draw the clouds they have seen with a description of what they looked like. Discuss observations with the class then show cloud types from the poster from Web Weather for Kids. Hand out student cloud sheet from Foss kit and have students describe the different characteristics of clouds with the teacher.

Next, the teacher will make a cloud in the bottle. Students will be asked to think about what is happening. Explain concepts and conclude lesson by reading, 'Cloudy With a Chance of Meatballs,' by Judi Barrett. Students will add cloud type to their air and weather journals. Class meteorologists will gather weather data and add to class calendar.

Day Eight Activity: Watching The Night Sky Co-Teach Strategy: One teach one assist

LT 2 - Students will know the components of weather by observing the sky. (*fact*)

LT 3 - Students will use basic weather tools to gather information about weather, and measure, record, and graph class data. (*skill*)

LT 4 - Students will wonder about and appreciate the natural world around them. (*value*)

Brainstorm a list of things students see in the sky during the day. Brainstorm a list of things students see in the sky at night. Compare the list. Take students outside and see if they can find the moon. If they can, ask them to describe its shape. When students come back to the classroom ask the class if they think the weather changes at night or stays the same. Ask if the moon and stars change or stay the same. Tell them they will be making night time observations of the sky at home for four nights. Hand out night sky worksheets: moon calendar, night sky log, and moon pictures. These show the various stages of the moon. Explain to students each night they will record the date, temperature, weather condition, wind and description of the moon. Show students a log and demonstrate how to fill it out. Handout a sample log to each student and have them fill it out with you. Tell students a letter will go home to parents in their homework

packet today explaining the project and providing the calendar and moon symbols. Tell them they can include anything else they see too, like planets, shooting stars or constellations. Explain what a constellation is and show some pictures.

Class meteorologists will gather moon data daily and add to the class moon calendar. Students will paste the appropriate moon shape into their moon calendar for the day and write and draw a description in their journal.

Sustained inquiry will be maintained through homework assignments in which parents will be asked to support learning. These activities will allow students to experience deep, personally meaningful-learning because family members are involved in enhancing what is being learned in the classroom.

Day Nine Activity: Measuring Rain

Co-Teach Strategy: One teach one assist

LT 2 - Students will know the components of weather by observing the sky.

LT 3 - Students will use basic weather tools to gather information about weather, and measure, record, and graph class data.

Ask students what kind of weather the area is known for. Ask what kind of weather clouds sometimes bring with them. Ask if anyone knows what clouds look like that bring rain. Show pictures of the types of clouds on the document camera and ask students to vote on which one they think brings rain. Tell students they will learn how to collect rain today by using a rain gauge. Ask students if they know how one works. Take some comments. Show students a rain gauge the class will be using to collect rain. Ask students to think about where a good location for a rain gauge would be and why. Remind students that as weather experts, their data has to be accurate. Set the rain gauge outside and record any data daily. Once rain is collected students will measure how much rain is in the container. Read 'Rain Dance,' by Thomas Locker. Class meteorologists will gather weather data and add to class calendar. Afterwards have students go back to their desks and write their journal entry for the day.

Day 10 Activity: Art & Weather Co-Teach Strategy: One teach one assist

LT 2 - Students will know the components of weather by observing the sky.

LT 4 - Students will wonder about and appreciate the natural world around them.

Read weather lore, and “It Looked Like Spilt Milk,” by Charles Shaw. Tell students they will participate in an art activity today inspired by the book. Demonstrate the activity and give instructions and pass out art materials. Have students create their own artistic split milk creations. Music will be played that has been inspired by the weather. When art work dries, place on the class bulletin board. Class meteorologists will gather weather data and add to the class calendar. Students will add a new entry in their journal. If there is time, teach them a weather song.

Day 11 Activity: Wind Observation & Pinwheels Co-Teach Strategy: On teach one assist

LT 2 - Students will know the components of weather by observing the sky.

LT 3 - Students will use basic weather tools to gather information about weather, and measure, record, and graph class data.

LT 5 - Students will be able to think, listen, and share with others, help others understand concepts, relate to other points of view, and communicate with respect.

Ask students what the wind is and what it does. Entertain some comments. Explain that wind is basically moving air. Tell them we are going to find the wind today by using bubbles. Explain the activity, instructions and expectations. Materials are handed out and students go outside and blow bubbles and try to find where the wind is. Students will be asked to talk about the speed and direction of the wind. When students reconvene back in class, ask them what they discovered. After student comments, tell them they will be making pinwheels. Ask what a pinwheel could show about the wind. Take some comments and explain the pinwheel can show us the speed of the wind. Explain steps and hand out materials. Give students a chance to experiment with speed and their pinwheels. Class meteorologists will gather weather data and add to class calendar. Give students some time to reflect and add their entry for wind speed.

Day 12 Activity: Wind Speed Co-Teach Strategy: One teach one assist

LT 2 - Students will know the components of weather by observing the sky.

LT 3 - Students will use basic weather tools to gather information about weather, and measure, record, and graph class data.

LT 5 - Students will be able to think, listen, and share with others, help others understand concepts, relate to other points of view, and communicate with respect.

Have them think about the activity they did in the prior lesson with the pinwheels. “What did it help us understand about the wind?” Have them turn and talk to a partner to share ideas. Call on a few students to report their ideas. Next, show them the pre-made anemometer. Tell students what it is and what its job is. Ask them how they think it works. Explain to students they will need to be able to count how many times the anemometer turns in 10 seconds. This will give us the speed of the wind. Use a hair dryer and different distances to move the anemometer. Have students count the seconds. Introduce weather terms that describe how fast the wind is blowing and have class agree on terms. Ask students what would happen outside if there was a gentle breeze, a strong breeze, etc., and what they would look for. Take the anemometer outside with the students to measure the wind speed. Debrief observations inside. Hand out the wind scale worksheet from Foss that compares speeds of various animals to different wind speeds [strong breeze 30 miles per hour/Polar bear 35 miles per hour]. The worksheet is a useful activity because it asks students to fill in a bar graph to reach a certain speed. Students will be making bar graphs later in the unit. Review the worksheet with the students. Demonstrate a few questions with them and then have them finish the sheet on their own after a check for understanding. Have students record their new weather data in their journal. Class meteorologists will gather weather data and add to class calendar. Answer any student questions.

Day 13 Activity: Wind Vane Co-Teach Strategy: One teach one assist

LT 2 - Students will know the components of weather by observing the sky.

LT 3 - Students will use basic weather tools to gather information about weather, and measure, record, and graph class data.

LT 5 - Students will be able to think, listen, and share with others, help others understand concepts, relate to other points of view, and communicate with respect.

Have students think about the activity they have done with the pinwheels and the anemometer. “What did it help us understand about the wind?” What else is important to know about the wind? Entertain some comments. Have students think about how we might be able to tell which direction the wind is coming from. Ask students if they have seen anything that shows which direction the wind is blowing from? Ask if students have seen a wind vane, and if so, what does it do, and how does it work. Next, show the pre-made wind vane. Using a hair dryer, blow it at the wind vane. Ask students to describe what they see about how it interacts with the wind. Ask what the wind vane tells us about the wind? When students are comfortable with the concept, tell them they are going to make their own wind vanes. Demonstrate activity, give instructions, and hand out materials. When students have made their wind vanes, take them outside and use them in the air. Ask them to think about what the wind vane tells us. After students come inside, ask them what discoveries they made. For homework, tell them they can make another type of wind direction finder, called a streamer. Show a pre-made streamer and ask how they think it might interact differently with the wind compared to the wind vane. Demonstrate using a hair dryer and have students point in the direction they think the wind is coming from. Bring a compass to teach directions. Explain the directions and the use of materials. Tell them the activity is written out for them to take home in their homework packet to make with their family. Have them record in their journal their new discoveries with the wind vane. Class meteorologists will gather weather data and add to class calendar.

Day 14 Activity: Close Co-Teach Strategy: One teach one assist

LT 2 - Students will know the components of weather by observing the sky.

LT 3 - Students will use basic weather tools to gather information about weather, and measure, record, and graph class data.

Have students get out their night sky log. Ask students what they discovered in their night sky observations. Ask them to make connections with weather. Add moon phases to the class weather calendar. Get out the concept map created on the first day of the unit. Ask students

to look over the concept map and ask what they have learned so far. Tell students we will be writing a weather poem together to capture all the excitement they have felt during this unit. Share some examples of weather poems that have been written, like 'Fog,' by Carl Sanburg. When the poem is finished have students go back to their desks and draw a picture that goes along with images or feelings generated by the poem. Post the finished product on the wall and have them record the poem in their air and weather journals along with a drawing.

Tell students the class will continue to record daily weather conditions on the class calendar until four weeks of data has been collected. Then they will graph results and explain discoveries. The teacher will explain the portfolio assessment and expectations for each student. Each student will select five items that reflect their best work. Each student will be given a checklist to select the items ahead of time.

After each poem or book reading during the unit, students will be encouraged to relate their feelings or sense of wonder to explore the topics further. Students will move from applying what they know about the air to synthesizing their knowledge in creation of a class poem.

Day 15 - 25 Activity: Collect and Graph Class Data and Portfolio assessments

Co-Teach Strategy: One teach one assist

LT 3 - Students will use basic weather tools to gather information about weather, and measure, record, and graph class data.

Students will continue to collect daily weather data and add to the class weather calendar until they have four weeks of data. During this time students will meet with teachers individually to go over their portfolios. They will also complete the "L" part of the K-W-L chart. This is the summative assessment.

When four weeks of data have been collected, the class will come back to discuss patterns, and to make their own weather graphs. Students will cut up graphic weather symbols. Students will use graph paper to visually represent the number of days it was cloudy, sunny, rainy, windy, etc., and place the appropriate weather symbol on the graph. This will create a different way to visualize information from the class weather calendar. Students will create a different chart for temperature. Using temperature graphics like [cold 32-50°, freezing 32°],

students will record the number of days at a certain temperature by using an “x” on their temperature charts. Teachers will ask if there is another way we could represent data. We will show the students how to make a bar graph and then ask them to compile their data from the chart to the bar graph. When students have their graph and chart completed, have students study them to discover patterns and talk about what the information means. Have them explain what the graph represents and why they know that. Ask them how many days it was sunny, rainy, and windy, etc. Ask what type of weather was the most common and for how many days.

When it is clear students have a good grasp of their graph data, turn to the same period last year and compare weather data. What was the same, what was different? Have students study the two sets of data and draw some conclusions. What were the coldest months? The teacher will prepare the data chart from a year ago and transfer it to a new weather graph so students can make comparisons easily between weather conditions and temperature.

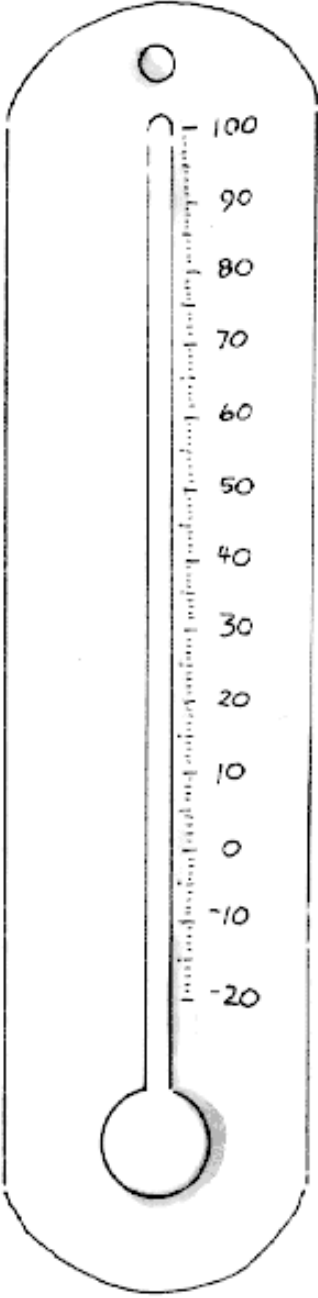
Today's Temperature

Name _____ Date _____

Color the thermometer with a red crayon to show today's temperature.

Today's temperature is

_____.








Hands-On Math Around the Year • Scholastic Professional Books

**Scholastic*

Pre-Post Assessment Learning Targets 1, 2, 3**What is Air K-W-L Chart:****Name:** _____

What I know	What I Want to Know	What I Learned

Student Assessment for Learning Targets 1, 2, 3, 5**My Learning Temperature in Class** *Check a box in each row that reflects you.*

What I do	Often	Sometimes	Rarely	Never
Record data accurately 				
Explain reasoning 				
Reflect on what I am learning 				
Help others and am careful 				
Take risks and offer solutions 				

What I think I did well this week:

What I think I can work on:

What I learned from someone else:

Teacher Checklist for Learning Targets 1, 2, 3, 5

Rating 4-3-2-1

4 - Superior performance and skills, consistently goes beyond requirements

3 - Solid performance, appropriate to expectations

2- Partial development of expectations, knowledge and skills, shows progress

1- Little of no progress in meeting expectations

Student	Accurate daily weather record	Shares results and reasoning	Reflects on learning	Is engaged & asks questions	Takes risks and offers solutions	Helps others and is careful

Portfolio Assessment for Learning Targets 1, 2, 3, 4

Assessment Criteria	4 Superior performance and skills, consistently goes beyond requirements	3 Solid performance, appropriate to expectations	2 Partial development of expectations, knowledge and skills, showing progress over time	1 Little of no progress in meeting expectations
Student selects one item that shows something they learned about air, and shows value of the world around them.	Student selects two items that show something they learned about air, shows value of the world around them, and connects to real life.	Student selects one item that shows something they learned about air, shows value of the world around them.	Student selects one item but provides partial explanation of what was learned.	Does not select an item and cannot explain what they have learned about air.
Student selects one item that shows something they learned about weather.	Student selects two items that show something they learned about weather.	Student selects one item that shows something they learned about weather.	Student selects one item but provides partial explanation of what was learned.	Does not select an item and cannot explain what they have learned about weather.
Student selects one item that shows they know how to make observations.	Student selects two items that show they know how to make observations.	Student selects one item that shows they know how to make observations.	Student selects one item but provides partial explanation of making observations.	Student does not select one item and cannot make observations.
Student selects one item that shows they know how to make good explanation.	Student selects two items that show they know how to make good explanation.	Student selects one item that shows they know how to make good explanation.	Student selects one item but gives a partial explanation.	Student does not select one item and cannot make an explanation.
Student selects one item they are most proud of, explains why, and shows value for the world around them.	Student selects two items they are most proud of, explains why, and shows value for the world around them, and connects to the real life.	Student selects one item they are most proud of, explains why, and shows value for the world around them.	Student selects one item they are most proud of and gives a partial reason why.	Student does not select one item they are most proud of.

**Rubric categories adapted from Foss*

Portfolio Assessment Student Checklist Learning Targets 1, 2, 3, 4

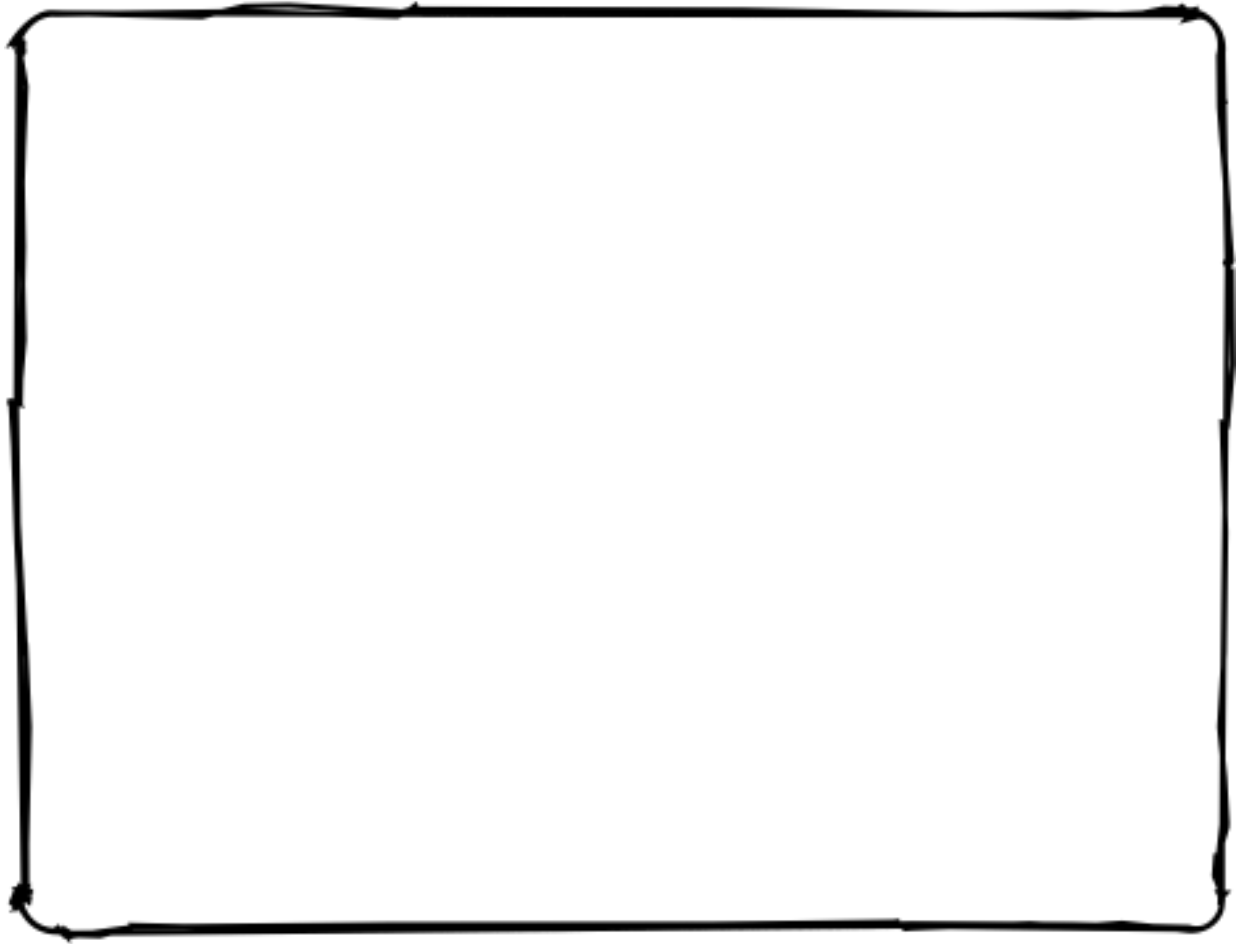
Name: _____

- ☐ Student selects one item that shows something they learned about air, shows value of the world around them.
- ☐ Student selects one item that shows something they learned about weather.
- ☐ Student selects one item that shows they know how to make observations.
- ☐ Student selects one item that shows they know how to make good explanation.
- ☐ Student selects one item they are most proud of, explains why, and shows value for the world around them.

**Adapted from Foss Assessment*

Air Worksheet (end of module performance assessment for LT 1)

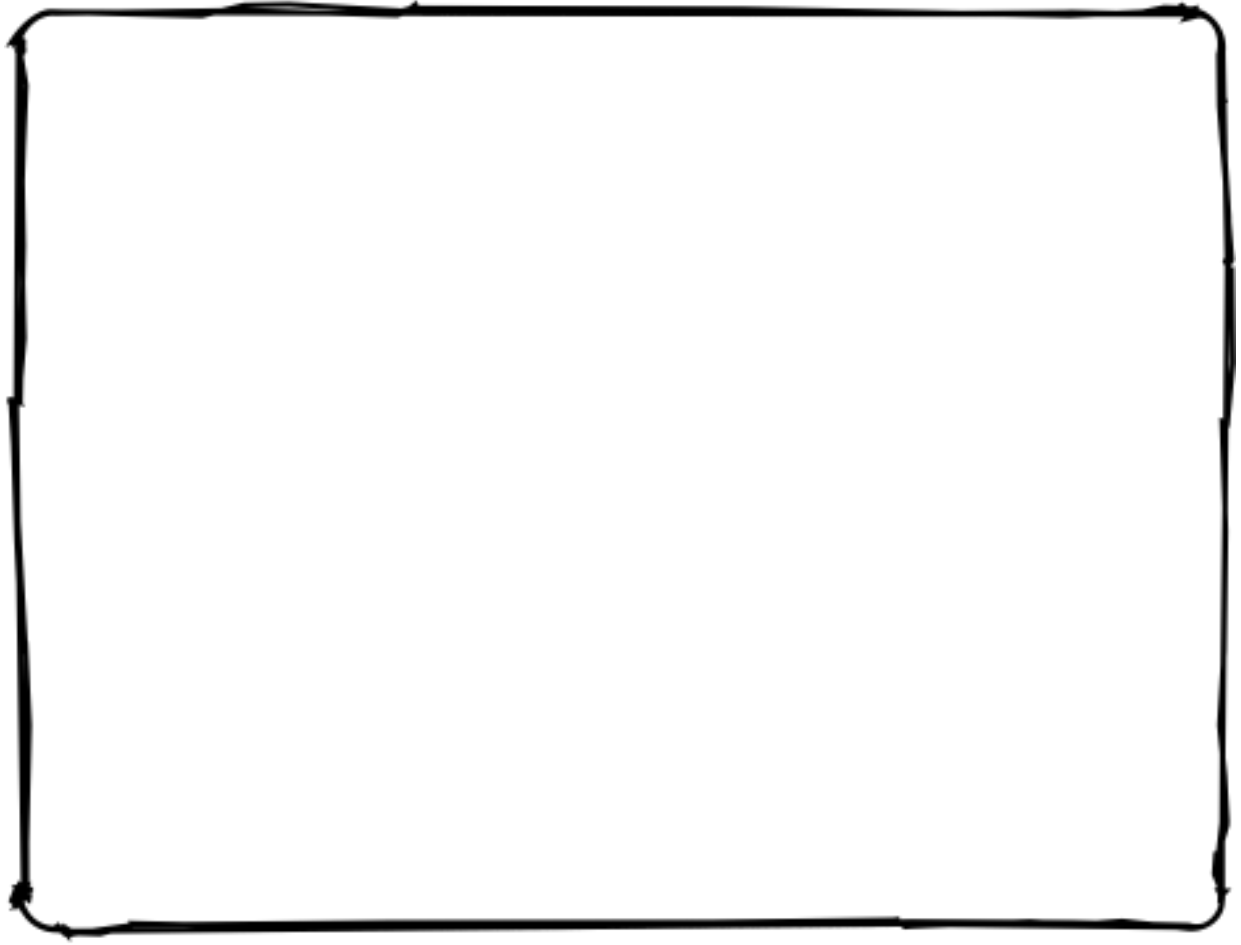
Draw and write about two things you have learned about air.



**Adapted from Foss Assessment*

Weather Worksheet (end of module performance assessment for LT 2)

Draw a picture and write what you observe about today's weather. Be specific about clouds or equipment you could use to observe weather.



**Adapted from Foss Assessment*

Worksheet Answers for Learning Targets LT 1, 2**Air Worksheet:**

Acceptable ideas are: air is a gas, air takes up space, air can be squished or compressed into a small area. Other acceptable concepts include: moving air is wind, air can make things move by pushing against objects, like parachutes and kites.

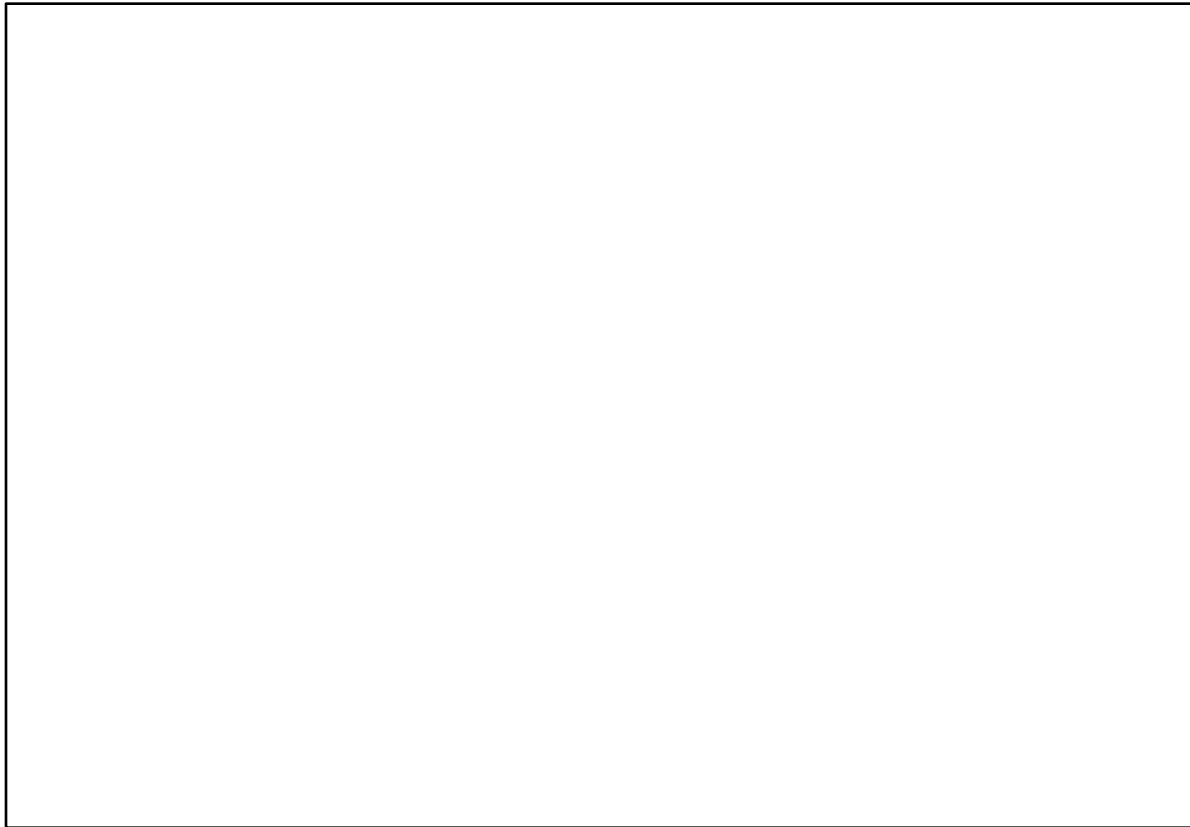
Weather Worksheet:

Acceptable ideas are: It is windy, rainy, cloudy (name clouds) snowing, cold, etc. Also, students may share what weather instruments do. For instance: a rain gauge measure how much it has rained, a thermometer measures the temperature of the outside air, an anemometer tells the wind speed, and a wine vane shows the direction the wind is blowing.

Air Toys Homework

Look around your home and try to find a toy that uses air to work. If you can't find one, make one up!

Draw a picture of your real or invented toy. Explain how it uses air to work.



**Adapted from Foss*

Poems

Fog

"The fog comes
on little cat feet.

It sits looking
over the harbor and city
on silent haunches
and then moves on."
—"Fog," Carl Sandburg

Looking at the Clouds

Sometimes I lie
in the grass,
And I look at the clouds
up high,
And I dream I am riding
a white horse,
And I'm galloping over the sky.
- Jill Eggleton

Weather

Weather is hot,
Weather is cold,
Weather is changing
As the weeks unfold.
Skies are cloudy,
Skies are fair,
Skies are changing
In the air.
It is raining,
It is snowing,
It is windy
With breezes blowing.
Days are foggy,
Days are clear,
Weather is changing
Throughout the year!
- Meish Goldish, 101 Science Poems & Songs for Young Learners, Instructor Books

Letter to Parents

Dear Parents of Room 60:

We have launched our science unit on air and weather! We will be exploring the air around us, identifying weather properties, and collecting and recording weather data for about a month. Students have been investigating the sky during the day and now we want to learn more about the night sky. Since we can't do this during the day, this has to be a homework assignment.

To make night-sky observations, we need you to take your child outside at night about the same time each night and observe the sky. Bundle up to stay warm, share some hot cocoa, and take a few moments to look at the stars with your child and talk about what you see. For example clear, cold nights usually mean stars will be visible. On cloudy nights, stars may not be visible. If you can identify planets or constellations, point them out to your child. Our goal is to instill wonder in your child about the natural world as well as collect data. Your child will need to pay special attention to the moon, its appearance and location in the sky. Add any notes about what you found together in the night sky. Have your child record observations on the Night Sky Log (attached). We need four nights of data. Please get started as soon as you receive this letter and return it in your child's homework folder. To complete an entry in the log, we need the date, temperature, description of weather, wind and moon phase. Students will know to draw the appropriate moon shape in the box.

You can find out more about the homework assignment and other activities at our air and weather website www.airaware.wikispaces.com. Students are compiling all their good work into an Air and Weather Journal, which they will take home and share with you when they are done.

Thanks so much for your help! If you have any questions at all call me at (206) 783-4261 or contact me via email at susan.alotrico@shorelineschool.edu.

Sincerely,

Susan Alotrico
Seattle University Student Teacher

**Letter Adapted from Foss*

Night Sky-Log Sample

Monday, January 8, 2010 6:30 p.m.
Date and Time

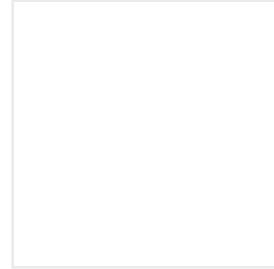
45 degrees F
Temperature

The weather is cloudy

The wind is breezy

Half of the Moon is bright

Special notes or discoveries



**Adapted from Foss*

Bibliography:

Barrett, Judi and Barrett, Ron (1978). *Cloudy With a Chance of Meatballs*. New York: Atheneum

A quirky story about how the weather provides all the food one little town can eat.

Beautiful Seattle (2009). *Seattle Climate Data January 2009*, Retrieved December 5, 2009, from <http://www.beautifulseattle.com/mthsum.asp>

This on-line source has climate data for Seattle by month and year. Data is collected from the National Weather Service and Seattle-Tacoma International Airport Station. The site serves as a public service and provides links to social, education, government, health, and other resources.

Brophy and Alleman, (2007). *Powerful Social Studies for Elementary Students*. California: Thomson Wadsworth.

This book outlines how to use big ideas and concepts to teach social studies and helps teachers focus their instruction and content.

DePaola, Tomie (1975). *The Cloud Book*. New York: Scholastic Book Services

Pictures are engaging and the weather is explained in simple language. Images along with the names of clouds are given.

Info Please (2009). *Weather Forecasting Clouds*. Retrieved December 6, 2009, from <http://www.infoplease.com/cig/weather/forecasting-by-clouds.html>

This site has a good deal of information on weather properties. It has a daily almanac and links to previous weather events on past dates.

Kaunakakai Multiage Primary (2002). *Properties of Water, Water Cycle and Weather Poems*.

Retrieved December 6, 2009, from http://www.k12.hi.us/~shasincl/poems_prop_cycle_weather.html#fog

This is website has a wonderful collection of poems addressing water, weather and environmental resources.

Locker, Thomas (2000). *Cloud Dance*. San Diego: Silver Whistle/Harcourt

Paintings show the many faces of a cloud. This book serves to integrate the art and science.

Locker, Thomas (1997). *Rain Dance*. San Diego, Calif.: Harcourt Brace & Company
Paintings reveal the water cycle with poetic language. This book serves to integrate the art and science.

Miami Museum of Science (2000). *Wind Streamers*. Retrieved November 19, 2009, from
<http://www.miamisci.org/hurricane/windstreamer.html>
This is a very worthwhile science resource for teachers. In my search for air and weather activities, I found short, easy to understand activities that use accessible materials. The graphics make asbstract concepts clear.

NASA (2003). Atmospheric Pressure. *It's a Breeze How Air Pressue Affects You*.
http://kids.earth.nasa.gov/archive/air_pressure/index.html
This on-line resource helps to clarify the concept of air pressure. Word search, games and activitites can help students and family understand this abstract concept that is a constant force on our lives every day.

National Geographic (2009). *Sounds Great Bottled Music*. Retrieved December 5, 2009, from National Geographic <http://kids.nationalgeographic.com/ActivitiesFunScience/Sounds-great>
This site has fun experiments on many environmental topics appropriate for school and home.

Regents of the University of California (2002). Foss Teacher Guide. *Air and Weather*. California: Lawrence Hall of Science
This Foss science kit is loaded with good information and easy to understand directions for all activities. It has a heavy focus on letting the student 'discover' learning. The kits come preloaded with most materials teachers need to teach the unit. I was very impressed it and while I won't use everything, I wish I could.

Scholastic (2009). *Today's Temperature*. Retrieved December 5, 2009, from
<http://teacher.scholastic.com/lessonrepro/lessonplans/profbooks/todaytemp2.htm>
Scholastic has great resources for teaching any subject. This lesson plans shows you how to record daily temperature with a handmade thermometer.

Shaw, Charles (1947). *It Looked Like Spilt Milk*. New York: Harper
Strange white shapes are revealed in paintings on blue background that change on every page. Simple rhymes connect images to words.

Suzuki, David (1994). *If We Could See the Air*. (Fernandes. E. Illus). Toronto: Stoddart
A simple story about why air is important to all living things.

Weather Wiz Kids (2009). *Weather information*. Retrieved December 5, 2009, from
<http://www.weatherwizkids.com/>
This is a great resource for teachers, students and family to learn about weather. It was created by a Metereologist in Indiana and has a huge menu of options and topics.

Weather Works. (2000). *Cloud and Sky Colors*. Retrieved December 6, 2009, from
http://www.weatherworks.com/files/SPECIAL_SAW_files/sky.color.chip.set.html
This is a fine resource for anyone studying the sky to help them accurately report the colors of the sky and clouds.

Web Weather For Kids (2000). *More on Clouds*. Retrieved December 6, 2009, from
<http://eo.ucar.edu/webweather/cloud2.html>
This site has interactive activities and experiments you can do in the classroom or at home, to help explain the why's and how come's of weather, air pressure and other natural phenomenon.